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Place attachment, disruption and transformative adaptation

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ABSTRACT

This paper explores place disruption, where transformative adaptation was proposed for flood risk management, by examining: a) the relationships between place attachment, place-related symbolic meanings, place-protective interpretative responses and attitudinal responses, and b) evaluation of governance processes. Questionnaires were administered to residents in Clontarf, County Dublin, Ireland in 2014 ($n = 280$) in the aftermath of community resistance to perceived transformative flood defences. Results highlight the dilemmas for individuals who recognise adaptation as necessary but who ascribe significant importance to valued places. Contrary to previous studies, our analysis shows place attachment to be strongest in individuals who perceive governance processes as inadequate, and finds that neither flood experience nor flood risk affect strength of place attachment and support for flood defences. We suggest that where transformative adaptation disrupts place and threatens place attachment, considering the views of both those affected and unaffected by hazardous events is paramount.

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1. Introduction

When a place becomes unavailable or is threatened, awareness of the benefits it provides may increase (Cheng & Chou, 2015). This suggests that under a changing climate, as environments are fundamentally altered or as adaptation requiring landscape modifications intensifies, individuals' attachment to place is increasingly likely to be challenged (Adger et al., 2009; Quinn, Lorenzoni, & Adger, 2015). Empirical research has repeatedly demonstrated how identities embedded in particular places and occupations influence climate risk perceptions, motivation and adaptation (Clarke, Murphy, & Lorenzoni, 2016; Marshall et al., 2013). Conversely, psychological change may also be necessary to promote adaptation and avoid maladaptation risks (Quinn et al., 2015).

Place attachment describes a usually positive emotional connection to certain locations or to particular landscapes, typically encompassing both physical and social elements (Devine-Wright, 2013; Lewicka, 2011), which may lead to specific individual and collective actions (Devine-Wright, 2009; Manzo & Perkins, 2006). Place attachment emerges through personal experience with the environment. Attributes such as natural environmental qualities, cultural values, mobility, length of residence and recreational opportunities have been shown to affect the development of attachment (Beery & Jönsson, 2017). Place attachment consists of two related dimensions: place dependence and place identity (e.g. Anton & Lawrence, 2016).

Place dependence refers to functional features of a place that facilitate certain activities and emotional connections (Brown & Raymond, 2007). Natural resource settings contribute strongly to creating dependence, which is often increased by frequent visitation of a place (Vaske & Kobrin, 2001). Place identity denotes how physical and symbolic features of places are embodied in an individual's sense of identity (Devine-Wright, 2013); this occurs through a long-term, complex process where place becomes a befitting part of a person's identity (Anton & Lawrence, 2016; Lewicka, 2008).

Researchers argue that repeated visitation to a place due to place dependence enhances place identity (Vaske & Kobrin, 2001). Others attest that the relative significance an individual attributes to a place through place dependence determines their extent of attachment and can also shape identity (Chow & Healey, 2008). Moore and Graefe (1994) demonstrated that when socio-demographic variables (e.g. age) and situational variables (e.g. distance of a recreational setting from home) are considered,

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similar socio-demographic variables correlated in similar ways to both place dependence and place identity. The literature is replete with examples where both physical and social attributes of place are interconnected and mutually reinforce place attachment processes (Brehm, 2007; Stedman, Beckley, Wallace, & Ambard, 2004). Consequently, researchers have frequently combined both dimensions to form a uni-dimensional measure of place attachment (Kaltenborn & Bjerke, 2002).

Disruptions to place may include relocation, physical landscape change, changes to legal or symbolic designations, or perceived/potential changes, often resulting in negative social and psychological consequences, affecting place attachment and its processes (Cheng & Chou, 2015; Devine-Wright, 2013). Individuals subjected to such processes may deploy coping mechanisms (e.g. resisting change, re-establishing place meanings, questioning powerful interests) to reduce threats of disruptions and protect their sense of attachment (Anton & Lawrence, 2016).

In the context of climate change, adaptation may lead to place disruption (Hess, Malilay, & Parkinson, 2008), although studies exploring this are few. Transformative adaptation is increasingly suggested as an approach to managing unavoidable climate change risks (O'Brien, 2016). Transformation implies non-linear changes to meaning, norms and values, social networks, power structures, institutional arrangements or regulations (IPCC, 2012). Studies exploring the relationship between place attachment and disruption arising from proposed transformative adaptation highlight the difficulties in implementing such transformative changes (Clarke et al., 2016; Marshall, Park, Adger, Brown, & Howden, 2012). Understanding interpretations of place change is crucial in determining the relationship between place and acceptance of disruption (Devine-Wright, 2009). Developing and assessing place-related meanings, for instance, via interpretative, evaluative and attitudinal measures in relation to disruptive place change may assist in this regard (Devine-Wright & Howes, 2010).

Perception and interpretation of change are related to individuals' awareness of potential disruption (Devine-Wright & Howes, 2010), and their views of processes and outcomes related to such disruption (Schlosberg, Collins, & Niemeyer, 2017). Weak governance surrounding public participation has been persistently identified as a barrier to transformation (Clarke et al., 2016; Gibson et al., 2016). Research suggests that where consultation is inadequate, place attachment processes may become threatened (Anton & Lawrence, 2016). Inclusive and participatory governance processes can reduce place disruption and may positively influence place-related values (Von Wirth, Grêt-Regamey, Moser, & Stauffacher, 2016), facilitating effective adaptation planning. The growing body of research on place attachment suggests that for disruptions to be minimised or overcome, place-related identities and meanings should be incorporated into policy and planning processes (Fresque-Baxter & Armitage, 2012). However, few studies have empirically examined how perceptions of governance processes and disruptive place change processes unfold where adaptation planning is concerned.

Using flood risk management in Ireland as an example of climate change adaptation, this paper examines disruptive place change in response to proposed transformative adaptation by:

1. understanding place-related symbolic meanings and the relationship between place-protective interpretative responses and place attachment.
2. exploring whether support for flood defences is constrained by the desire to prevent disruptive place change occurring.
3. investigating the relationship between oppositional attitudes towards proposed adaptation and perceptions of governance processes.
4. examining differences in place attachment and support for proposed flood defences (and flood defences in general) based on both flood experience and flood risks.

2. Methods

2.1. Background to study

This study is centred on Clontarf, County Dublin, Ireland, a middle-class coastal suburban community located 6 km north of Dublin city centre with a population of approximately 31,000. The community is bordered to the east by the Irish Sea and by Bull Island, a UNESCO Biosphere Reserve. The area is characterised by several physical landscape features including a 3 km coastal promenade, which runs parallel to the coast and adjoins the suburb. The promenade is highly utilised for recreational purposes and is considered a focal point of community life.

Whilst coastal flooding in Clontarf has been limited in the last decade, significant tidal flooding occurred in 2002 and 2004. Following these events, Dublin City Council (DCC) undertook an examination to identify locations in Dublin at risk of coastal flooding, through which Clontarf emerged as highly exposed. Several flood defence options were identified as offering an appropriate level of protection for a 1-in-200 year flood event, the national standard for coastal defences (Department of Environment, Heritage and Local Government, 2009). Of those options identified, DCC subsequently proposed constructing an earthen mound through the promenade and erecting flood walls elsewhere, ranging in height from 0.85 m to 2.75 m (Fig. 1), for which planning approval was granted in 2008.

In 2011, two community groups representing residents and businesses became aware of the proposed project and formed a coalition to oppose the defences. Virtual depictions of the proposed defences were subsequently widely distributed by community groups at information meetings to help residents understand the impacts on the landscape (Fig. 1). Community groups raised concerns over both the scale of the proposed defences and the public consultation process, and were influential in compelling DCC to abandon plans despite the council investing €1.1 m developing defences to that point. Discussions for developing alternative flood defences are ongoing. The flood defences can be characterised as transformative to the extent that completion was deemed to fundamentally change the existing landscape. This was deemed to challenge existing social values and norms ascribed to the promenade and significantly alter its functionality from both the coalition community groups and wider community perspectives (Clontarf.ie, 2011a; Clontarf.ie, 2011b; IPCC, 2012).

2.2. Participants and sample

Questionnaires were distributed to Clontarf residents in July 2014. Although more than two years after the project stalled, awareness levels of the flood defences were still significant for three reasons. First, a protest against the project in 2011 was attended by approximately 5,000 people. Second, the flood defences received significant national media and political attention, and third, discussions over alternative flood defences were ongoing in 2014. Residents were frequently informed of these through a community website and newsletter.

A pilot questionnaire involving six Clontarf residents was undertaken in July 2014, after which questions were refined based on respondent feedback. Questionnaire distribution employed a drop-and-collect method, whereby they were circulated on one day and collected the following day (Allred & Ross-Davis, 2011). Residents

Fig. 1. Left - existing view of Clontarf promenade. Right - virtual depiction of proposed flood defences along Clontarf promenade. Source: Dublin City Council (2011).

both adjacent to the promenade and further inland were randomly sampled; every third house was included on randomly selected roads. One questionnaire was left per household. Questionnaire distribution occurred within the confines of two parishes (referred to herein as Clontarf) derived from Irish population census boundaries, within which the defences were proposed – namely Dollymount and Clontarf, St. John's (Central Statistics Office, 2014). The parishes represent a subset of the larger Clontarf area. The village of Clontarf is also located at the intersection of these parishes.

Census data showed the population of both parishes in 2011 as 9,867 (Central Statistics Office, 2014). 378 questionnaires were distributed, with 280 returned (response rate 74.1%). 88.1% of respondents had lived in Clontarf for 10 years or more i.e. prior to severe flooding in 2004 and the initial flood defence proposals put forward by DCC. Sample biases were identified by comparing proportional differences between the sample size and census data for each socio-demographic category (Table 1). Among the survey participants, younger respondents were under-represented whilst older individuals were over-represented. Similarly, participants were significantly more likely to have higher levels of educational attainment. Additionally, retired respondents were over-represented and students under-represented within the study. Finally, individuals were more likely to own and were less likely to rent their property compared with census data.

2.3. Measures

To understand processes of disruptive place change, questionnaires were designed to elicit place attachment, symbolic place-related meanings, place-protective interpretative responses, attitudinal responses, and perceptions of governance processes surrounding flood defences. In reporting results, pairwise deletion methods were employed for missing data values to maximise valid data (Pallant, 2013). All measures, conditions and data exclusions for analyses are presented herein.

2.3.1. Place attachment

Place attachment was operationalised using a questionnaire consisting of items related to place dependence and place identity. Drawing on a review of the literature, nine statements were used to measure place attachment (e.g. Brown & Raymond, 2007; Kaltenborn & Bjerke, 2002). Place dependence was captured through a three-item scale, whilst place identity comprised a six-item scale. A Cronbach alpha test demonstrated the place attachment scale to have good internal reliability ($\alpha = 0.84$) (Von Wirth et al., 2016). However, an examination of corrected-item total correlations indicated that responses to the place identity statement *"Clontarf is seen from outside as possessing prestige"* was weakly correlated with the overall scale ($r = 0.26$). The statement was subsequently removed from analysis and the scale's reliability

Table 1
Socio-demographic characteristics for questionnaire respondents compared with census data.

Demographic factors		Clontarf promenade	Census data: Dollymount and Clontarf – St. John's
Age (%)	18–29	4.4**	18.7
	30–44	18.9*	26.4
	45–59	37.0**	26.9
	60–74	25.2**	16.4
	75+	14.4	11.6
Sex (%)	Male	51.6	47.1
	Female	48 .4	52.9
Ceased Education (%)	Second level	22.5*	29.9
	Vocational qualification	8.8	6.3
	Bachelor's degree or equivalent	34.5*	26.9
	Masters/PhD or equivalent	28.5**	19.2
	No formal qualifications	1.6*	.4
Employment status (%)	Working full-time/part-time	53.5	53.2
	Looking after children/home	5.5	8.3
	Unemployed	2.2	3.9
	Retired	33.6**	18.9
	Student	3.3**	12.7
Household status (%)	Buying through mortgage	36.7*	43.4
	Own outright	59.5**	33.9
	Renting	3.4**	20.5

Note: * significant at $p < .05$; ** significant at $p < .001$ compared with census data (Central Statistics Office, 2014).

improved ($\alpha = 0.85$). The eight items were combined into a unidimensional scale measuring place attachment similar to other researchers (Kaltenborn & Bjerke, 2002) (Table 2). Responses were measured using a 5-point Likert scale ranging from 1 = Strongly agree, to 5 = Strongly disagree, with 3 = Neither agree nor disagree.

2.3.2. Symbolic place-related meanings

Place-related meanings were elicited using a free association task (Devine-Wright & Howes, 2010). Participants were asked to *'identify, in order of importance, three aspects of the promenade that are of most value to you'*. Content analysis was conducted to categorise observable themes ($n = 738$). Following several iterations to refine categories and avoid overlap, 7 thematic categories and 44 sub-themes were first developed by one of the authors using deductive methods. Inter-rater reliability analyses using the percentages of agreement method, in which a second author coded all responses using the pre-defined thematic categories, resulted in 93% agreement of place-related meaning categorisations. To identify potential biases in coding responses between authors, inter-rater reliability analysis was also conducted by a third researcher external to this study. Results also showed high agreement (91%) with pre-defined thematic categories. The core themes are given in the Appendix; proportional responses were generated for each thematic category (Section 3.1).

2.3.3. Place protective interpretative responses

Interpretation of proposed flood defence outcomes was measured using nine negatively worded Likert items e.g. *The proposed flood defences would have … 'negatively impacted the cultural heritage of Clontarf', 'created an eyesore', 'spoiled views of the bay'* (Table 2). Each of the statements were measured on a 5-point Likert scale as above.

2.3.4. Attitudes towards flood defences and place disruption

Attitudinal feelings towards place change were measured using three separate 5-point Likert statements (Table 2). Attitudinal support was measured with the statement *'I was in favour of the proposed flood defences'*. This statement was also reverse-coded to *'I was not in favour of the proposed flood defences'* to denote oppositional attitudes to the proposed flood defences, with Likert statement responses also reverse coded; 1 = Strongly disagree, to 5 = Strongly agree.

A second Likert statement, *'Flood defences are necessary to protect Clontarf from flood damage'*, was included to measure attitudinal feelings towards the general need for flood defences in Clontarf. The statement *'Keep the promenade as it is, there is no need for change'* was included to understand individuals' attitudes towards disruptive change. The relationship between these two statements was used to determine respondents' attitudes to flood defences and whether they perceived these would change the promenade's form or function.

The statements *'I was in favour of the proposed flood defences'* and *'Flood defences are necessary to protect Clontarf from flood damage'* were also used to understand if attitudes towards the proposed

Table 2
Descriptive statistics for disruptive place change measures and Cronbach alpha reliability analysis for eight-item place attachment scale and eight-item perceptions of governance process scale.

	Cronbach alpha (α)	Mean (M)	Standard Deviation (SD)	Median
Place attachment (one composite item) *n* = 254	**.85**	**1.77**	**.64**	**1.63**
Place identity				
Clontarf is part of my identity	.77	1.77	.95	1.00
I have good memories of Clontarf	.67	1.38	.59	1.00
My family has connections to this area from far back	.46	2.61	1.46	2.00
I feel that Clontarf is a part of me	.75	1.87	.99	2.00
I feel part of a community in Clontarf	.70	1.63	.74	1.00
Place dependence				
No other place provides the same opportunities to do what I like in my spare time	.57	1.98	1.02	2.00
It is important to me how this area develops	.55	1.27	.46	1.00
The area is important to me because of my lifestyle	.61	1.59	.78	1.00
Attitudes to disruptive place change				
I was not in favour of the proposed flood defences		1.81	1.21	1.00
Keep the promenade as it is, there is no need for change		3.09	1.20	3.00
Flood defences are necessary to protect Clontarf from flood damage		2.02	.90	2.00
Place-protective interpretative responses				
The proposed flood defences would have …				
Negatively impacted the cultural heritage		1.94	1.11	2.00
Decreased security of the place		1.76	1.07	1.00
Promoted anti-social behaviour		1.72	1.03	1.00
Created an eyesore		1.44	.86	1.00
Spoiled views of the bay		1.32	.76	1.00
Impacted wildlife		2.51	1.05	3.00
Reduced property values		2.18	1.03	2.00
Damaged tourism		2.02	1.05	2.00
Reduced the recreational value		1.45	.90	1.00
Perceptions of governance process (one composite item) *n* = 229	**.88**	**3.86**	**.76**	**4.00**
The planning process was fair	.64	3.96	1.05	4.00
The planning process was open & transparent	.72	4.00	1.04	4.00
The local community was recognised as a partner in the planning process	.74	3.92	1.09	4.00
Community views were listened to	.72	3.69	1.17	4.00
Information from Dublin City Council was truthful, sincere and open	.72	3.78	1.02	4.00
It was easy to access and obtain information about the flood defence plan	.66	3.49	1.11	4.00
I was able to influence the planning and decision-making process	.34	3.63	1.07	4.00
I trust in Dublin City Council to make flood defence related decisions regarding Clontarf	.60	4.07	1.02	4.00

Note: Five-point Likert-scale responses; 1 = Strongly agree, 2 = Agree, 3 = Neither agree nor disagree, 4 = Disagree, 5 = Strongly disagree.

flood defences and attitudes towards the general need for flood defences differed between residential location (see Section 2.3.5).

2.3.5. Quantifying residential location

Residential location was quantified through two separate measures to examine potential response differences between flood experience and flood risk. Both stratified datasets were used to explore interactions between i) flood experience and ii) flood risk, and attitudes towards proposed flood defences, place attachment and perceptions of governance processes. First, the question *'Have you ever been affected by flooding in Clontarf?'* was utilised to capture flood experience, with a dichotomous Yes/No response option. Those who answered 'Yes' were asked how they had been affected by historical flooding in Clontarf. Responses were coded into four experiences of flooding; 1 = Directly affected (property flooded), 2 = Indirectly affected (traffic disruption, road closures, flood threats to property), 3 = Affected but not specified, and 4 = Unaffected.

Second, flood risk was quantified using available flood maps for Clontarf for a 1-in-200 year flood event (Dublin City Council, 2011). These flood maps assessed flood risk based on local topography, the condition of existing flood defences and extreme tide level scenarios (Royal Haskoning, 2005). Respondents were subsequently divided into two groups. Those objectively at-risk, and therefore afforded protection through the proposed flood defences, were classified as "coastal" residents. Those not exposed to these flood risks were defined as "inland" residents. Both measures of residential location were examined because individuals in a flood risk area might be unaware that they are exposed to flood risks, particularly if they have never experienced flooding in the past. They therefore might respond to questions believing that they are not exposed to flood risks.

2.3.6. Perceived effectiveness of governance process and stakeholder groups

To measure perceived effectiveness of governance processes, eight Likert statements were developed based on a review of existing literature (e.g. Gross, 2007). These items encompassed perceptions of fairness, transparency, inclusive decision-making, legitimacy and trust. Statements included: *'The planning process was fair'*, *'Information from Dublin City Council was truthful, sincere and open'*, and *'It was easy to access and obtain information about the flood defence plan'* (Table 2). Responses ranged from 1 = Strongly agree, to 5 = Strongly disagree. The items were used in two ways. First, they were used individually to examine the relationship between oppositional attitudes and perceptions of governance processes. Second, as the 8 items showed good internal consistency ($\alpha = 0.88$), they were combined to form a uni-dimensional scale measuring overall perceptions of governance processes (Table 2). This scale was subsequently used to examine whether perceptions of governance processes influence place attachment.

Finally, to elicit which stakeholder groups were viewed as legitimate, participants were asked to indicate which organisation best represented local community views. Response options included elected representatives, Dublin City Council, Clontarf Residents Association and Clontarf Business Association.

3. Results

3.1. Place-related meanings, interpretative responses and place attachment

Analysis of free association data of place-related symbolic meanings revealed that the promenade was primarily recognised for its aesthetic and recreational values. Its coastal location and its connection with nature were intrinsic to this. For example, in the first free association responses (Section 2.3.2), the three most frequently identified thematic categories were beautiful environment (52%), recreational amenity (45%) and community concerns (2%) (Table 3). Similarly, among the second free association responses, recreational amenity (50%) and beautiful environment (45%) were cited most frequently, followed by social factors (2%). Finally, in the third free association, beautiful environment (50%), recreational amenity (39%), social factors (4%) and community concerns (4%) were the place meanings ascribed to the promenade. The core theme *'beautiful environment'* comprised subthemes including scenery, sea, wildlife, identity and preservation, whilst the *'recreational amenity'* theme was characterised by subthemes including exercise, recreation, relaxation and sports (see Appendix). The regular associations of aesthetic features and recreational functions suggests that changes to the promenade would challenge those symbolic meanings, and thus deeply affect place attachment should place disruption occur.

Spearman's rank correlations were also performed between place attachment and place-protective interpretative responses (Table 4). Findings demonstrated a positive correlation between place attachment and each item related to negative interpretation of change, including those of the two primary free association thematic categories (*'beautiful environment'* and *'recreational amenity'*). For example, the relationship between place attachment and interpreting that flood defences would have *'created an eyesore'* ($rho = 0.25$, $n = 250$, $p < .001$), *'reduced the recreational value'* ($rho = 0.24$, $n = 251$, $p < .001$), *'negatively impacted on the cultural heritage'* ($rho = 0.40$, $n = 251$, $p < .001$), *'spoiled views of the bay'* ($rho = 0.23$, $n = 249$, $p < .001$) or *'impacted wildlife'* ($rho = 0.34$, $n = 245$, $p < .001$) all displayed statistically significant positive correlations.

Consistent rankings of *'beautiful environment'* and *'recreational amenity'* as the two most frequently recorded themes during the free association task, and the significant positive correlations between place attachment and each of the statements measuring negative interpretive place change, demonstrate that the primary reasons for respondents' attachment to the promenade were specifically its natural aesthetic features and its importance in fulfilling recreational needs.

3.2. Relating place disruption to support for flood defences

To understand if individuals were willing to accept some form of disruptive place change, the relationship between the statements *'Flood defences are necessary to protect Clontarf from flood damage'* and *'Keep the promenade as it is, there is no need for change'* was examined. Correlation analysis indicated a strong negative

Table 3
Response proportions for free association of place-related symbolic meanings.

Thematic category	Free association 1	Free association 2	Free association 3
Beautiful environment	52%	45%	50%
Recreational amenity	45%	50%	39%
Social	Not identified	2%	4%
Community concerns	2%	1%	4%

Table 4
(a) Bivariate correlation between place attachment (one composite item, see Table 2) and both place-protective interpretative responses and perceptions of governance processes. (b) Bivariate correlations between opposition to proposed flood defences and perceptions of governance processes.

	Place attachment	Not in favour of proposed flood defences
Place-protective interpretative responses		
The proposed flood defences would have …		
Negatively impacted the cultural heritage	.40**	
Decreased security of the place	.24**	
Promoted anti-social behaviour	.29**	
Created an eyesore	.25**	
Spoiled views of the bay	.23**	
Impacted wildlife	.34**	
Reduced property values	.35**	
Damaged tourism	.38**	
Reduced the recreational value	.24**	
Perceptions of governance process		
The planning process was fair	−.30**	−.48**
The planning process was open & transparent	−.24**	−.44**
The local community was recognised as a partner in the planning process	−21*	−.46**
Community views were listened to	−.20*	−.35**
Information from Dublin City Council was truthful, sincere and open	−.28**	−.39**
It was easy to access and obtain information about the flood defence plan	−.12	−.28**
I was able to influence the planning and decision-making process	−.05	−.02
I trust in Dublin City Council to make flood defence related decisions regarding Clontarf	−.19*	−.45**

Note: * significant at $p < .05$; ** significant at $p < .001$.

relationship between the statements ($rho = -0.46$, $n = 256$, $p < .001$), with descriptive statistics suggesting that whilst individuals recognised the necessity for flood defences, they were less supportive of change in the promenade's appearance (Table 2). These results reveal the contradictory nature of both apathy to and recognition of the need for change in relation to flood management.

3.3. Role of governance on perceptions of disruptive change

Spearman's rank correlations were performed between each of the eight items measuring perceptions of the governance process related to public participation and oppositional attitude (i.e. *'I was not in favour of the proposed flood defences'*) (Table 4). Significant negative relationships between oppositional attitude and each but one of the statements measuring positive perceptions of the governance process emerged (Table 4). For example, opposition towards proposed defences was negatively correlated with *'trust in Dublin City Council to make flood defence related decisions regarding Clontarf'* ($rho = -0.45$, $n = 254$, $p < .001$), the *'community was recognised as a partner in the planning process'* ($rho = -0.46$, $n = 253$, $p < .001$), and *'the planning process was fair'* ($rho = -0.48$, $n = 249$, $p < .001$). Analysis of descriptive statistics subsequently indicated that individuals were largely opposed to the proposed flood defences, believing that governance processes were inadequate (Table 2).

These sentiments were reflected in representation of community views. Of the four primary stakeholder groups, Clontarf Residents Association ($n = 239$) and Clontarf Business Association ($n = 142$) were regarded as most likely to represent community views, with Dublin City Council recording the lowest count across the groups ($n = 13$). Lack of trust in the local authority to make decisions about flood management (Table 4), and the sentiments that the community was not recognised as a partner in the planning process, indicate negative perceptions of governance processes.

To understand the relationship between perceptions of governance and place attachment further, the eight items measuring perceptions of the governance process were combined to create a uni-dimensional scale. Respondents were subdivided into groups reporting strong (score ≤ 1.50), moderate (2.50–3.50) and weak (3.51–5.00) perceptions of the governance process based on similar categorisations utilised by Devine-Wright and Howes (2010). Since the number of cases in the *'strong'* governance category was small ($n = 1$), it was not included in further testing. A Mann-Whitney U Test was used to examine whether place attachment differed between *'moderate'* and *'weak'* governance subgroups. Analysis revealed a significant difference in place attachment between individuals who perceived the governance process as moderate ($Md = 2.00$, $n = 57$) compared to those who viewed it as weak ($Md = 1.50$, $n = 148$, $U = 2974$, $z = -3.29$, $p < .01$, $r = 0.23$). Individuals were likely to display higher levels of place attachment where they perceived the governance process as weak compared to those who believed it was moderately effective.

3.4. Effects of i) flood experience and; ii) flood risk on place attachment, attitudes towards flood defences and perceptions of governance processes

First, to test whether experience of flooding contributes to lower levels of place attachment, a Kruskal-Wallis test was conducted using each of the four subgroups (see Section 2.3.5). The results indicated no significant difference in place attachment between subgroups (Gp 1, $n = 22$: directly affected, Gp2, $n = 13$: indirectly affected, Gp3, $n = 10$: affected but unclear how, Gp4, $n = 207$: not affected), χ^2 (3, $n = 252$) = 6.10, $p > .05$), with individuals in each category reporting similar levels of place attachment. The effects of residential location (coastal versus inland residents) was also explored with respect to place attachment. A Mann-Whitney U Test showed no significant differences in place attachment between coastal ($Md = 1.69$, $n = 24$) and inland respondents ($Md = 1.50$, $n = 185$, $U = 2202$, $z = -0.07$, $p > .05$, $r < 0.01$).

Second, the association between attitudes towards proposed flood defences and flood experience was examined. Again, no significant difference in support for the proposed flood defences was observed across subgroups (Gp 1, $n = 22$: directly affected, Gp2, $n = 13$: indirectly affected, Gp3, $n = 10$: affected but unclear how, Gp4, $n = 218$: not affected), χ^2 (3, $n = 263$) = 3.64, $p > .05$). The relationship between residential location and attitudes towards proposed flood defences was then examined. No significant differences emerged between groups, with both coastal ($Md = 5.00$, $n = 26$) and inland respondents ($Md = 5.00$, $n = 190$, $U = 2000$,

$z = -0.1.79$, $p > .05$, $r = 0.12$) displaying similar attitudes, suggesting that exposure to flood risks was not sufficient in influencing support for the proposed flood defences.

Third, the relationship between flood experience and general support for flood defences was investigated. Again, the results revealed no significant differences between each subgroup (Gp 1, $n = 23$: directly affected, Gp2, $n = 14$: indirectly affected, Gp3, $n = 10$: affected but unclear how, Gp4, $n = 219$: not affected), χ^2 (3, $n = 266$) = 1.18, $p > .05$). The association between residential location and general support for flood defences was examined. Again, coastal respondents ($Md = 2.00$ $n = 25$) were not statistically more likely to support flood defences in general compared to those living inland ($Md = 2.00$, $n = 191$, $U = 2367$, $z = -0.08$, $p > .05$, $r < 0.01$), further strengthening the argument that neither experience nor risk of flooding contribute to heightened demands for adaptation.

Finally, the relationship between flood experience and the composite measure of perceptions of governance processes was examined (see Section 2.3.6). The results indicated no significant difference in perceptions between subgroups (Gp 1, $n = 17$: directly affected, Gp2, $n = 12$: indirectly affected, Gp3, $n = 8$: affected but unclear how, Gp4, $n = 169$: not affected), χ^2 (3, $n = 206$) = 4.32, $p > .05$), with individuals in all four categories reporting similar perceptions of governance processes. The influence of residential location was also explored with respect to perceptions of governance processes, with no significant differences obtained in perceptions between coastal ($Md = 4.25$, $n = 21$) and inland residents ($Md = 3.88$, $n = 161$, $U = 1492$, $z = -0.88$, $p > .05$, $r = 0.06$).

4. Discussion

Where disruptive change is viewed as positive and familiar, both support for change and place attachment can increase, enabling a pathway for transformation i.e. disruptive change does not always produce negative attitudes (Von Wirth et al., 2016). Respondents in this study recognised the need for flood defences, but were less supportive where flood defences required changes to the form and/or function of the promenade. Where individuals recognise the need for place change, but symbolic values associated with place appear to contradict such changes, some form of cognitive transformation may be necessary to overcome the psychological dissonance between the desire for both stability and change. In this context, educational awareness has been shown to play a supportive role in facilitating transformative adaptation (Schlosberg et al., 2017). Respondents in this study however, criticised the availability and transparency of information from the local authority. Moreover, increasing educational awareness alone may be insufficient to encourage adaptation where place attachment is concerned (Lewicka, 2011).

Researchers have suggested that once climate change becomes tangible, societal demands for adaptation will intensify (Adger, 2016). Experience of extreme weather events may impact place meanings (Carroll, Morbey, Balogh, & Araoz, 2009). Conversely, individuals may proactively influence place attachment processes, counteracting effects on value change caused by extreme weather. Negotiating this dichotomy for both concurrent stability and change is likely to prove difficult as this study confirms, but is likely to be more acceptable than the alternative i.e. continued flood risks. Overcoming such obstacles is likely to hinge significantly on how adaptation is planned and implemented, and is thus strongly dependent on effective governance.

Inadequate consultation can weaken place attachment by diminishing feelings of self-efficacy and control (Anton & Lawrence, 2016). Results from Clontarf contradict these findings. Our results demonstrate that place attachment sentiments were strongest amongst individuals who perceived governance processes as weak, supporting previous studies which suggest that individuals with stronger place attachment are likely to place greater importance on participatory processes (Mesch & Talmud, 2010). To reduce or overcome disruptions, place-based identities and meanings should be incorporated into policy and planning processes (Agyeman, Devine-Wright, & Prange, 2009; Fresque-Baxter & Armitage, 2012). As this study illustrates, understanding emotional place-related values early in the adaptation process may contextualise attributes of place by detailing what aspects cause concern where disruptions are proposed.

Marshall et al. (2013) found that individuals with local knowledge and lower attachment to place were more likely to have the capacity to implement transformative adaptation. This raises two important points. First, it is often those with higher levels of place attachment who are more willing to engage in public participation processes (Bernardo, 2013). In the context of fair and inclusive governance, this raises a challenge for decision-making that aims to be representative of the wider population rather than being responsive to those who might exert greater influence on decision-making processes (Fresque-Baxter & Armitage, 2012). And second, place attachment can create significant reserves of local knowledge (Mock et al., 2016), which might also help to better inform adaptation planning. In this regard, studies demonstrate that local knowledge often remains underutilised in environmental decision-making at the expense of scientific expertise (Burley, Jenkins, Laska, & Davis, 2007). Notably, respondents in this study unanimously agreed that whilst community organisations were the most likely to represent community views, local knowledge was not used to inform the initial decision-making process.

Despite assertions that intentions to take future adaptive actions is influenced by past experiences of extreme events (Rawluk, Ford, Neolaka, & Williams, 2017), findings from Clontarf showed no such relationship. Instead, we found that both flood experience and flood risk, and subsequent willingness to adapt, are insufficient to encourage people to take preventative actions and affect-based variables such as place attachment interact to negatively moderate its effect (De Dominicis, Fornara, Ganucci Cancellieri, Twigger-Ross, & Bonaiuto, 2015). Moreover, in contrast to several other researchers who have demonstrated that place attachment diminishes based on experience of hazardous events (e.g. Brown & Perkins, 1992; Ellis & Albrecht, 2017), no significant differences were reported in strength of place attachment between those with or without flood experience. Quinn et al. (2015) attest that where climate change impacts are relatively benign, the impacts on individual's sense of place will occur in a slow and enduring fashion. That place attachment remained strong in Clontarf irrespective of individuals' experience of flooding is perhaps demonstrative of the relative infrequency with which tidal flooding has occurred in Clontarf since 2004. As climate change becomes tangible and extreme events increase in frequency and intensity, demands for adaptation to protect livelihoods and homes are likely to increase (Hess et al., 2008), and a re-evaluation of the things that people value in places is expected to occur (Clarke et al., 2016; Olsson et al., 2006).

These findings raise several points for adaptation planning. First, considering the views of both those at-risk and those less exposed to extreme events is critical in overcoming adaptation barriers. Ignoring or prioritising the views of segments of a community based on their experience or risk of extreme events may be a precarious strategy, particularly where place attachment is concerned. Place attachment may be equally important regardless of one's experience or risk of flooding. Where landscapes become threatened because of adaptation planning, our results demonstrate the need to consider the views of the wider community. Second, it further highlights the benefits of early proactive

adaptation, particularly whilst there exists sufficient community-wide recognition of the need for adaptation. As concerns for fairness in adaptation increase, attempting to manage place attachment processes at a community level by proactively taking adaptive actions is likely to prove fairer in terms of process and outcome compared to alternatives of no, or delayed adaptation. The latter are liable to disproportionately affect place attachment for those directly experiencing weather-related impacts.

4.1. Future research

Whilst this study has illustrated that those who exhibit stronger place attachment are more likely to perceive governance processes as inadequate, it was not possible to identify a causal relationship between these. It may be that strong place attachment acted as a mediator for interpreting governance processes as weak, thereby contributing to opposition to disruptive place change. Equally, perceptions of inadequate public participation may have resulted in individuals developing a stronger sense of place attachment, leading to stronger feelings of disruptive place change. It would be particularly interesting for future research to examine the causal relationship between these factors, which would heighten arguments for considering the relationship between place attachment and willingness to act in adaptation planning.

Although no significant differences were reported between those with and without flood experience, future research could explore levels of place attachment and support for flood defences immediately after a flood event, particularly focusing on if and how place attachment changes in response to such risks. Such approaches might also improve understanding of resistance to change because of place-related values.

5. Conclusion

Our results demonstrate the challenges associated with transformative adaptation where communities wish to limit and regulate disruptive place change impacts. Specifically, where adaptation is recognised as necessary by individuals but place attachment reduces support for specific measures, a psychological change in what individuals' value may prove necessary. As demands for transformative adaptation intensify under a changing climate, where place attachment processes are concerned, proactive adaptation is likely to prove more acceptable and fairer for individuals than alternatives that transform places involuntarily through experience of extreme weather events or through a lack of community involvement in decision-making. Whilst a transformation of individual understandings or knowledge may prove beneficial for proactive adaptation, where individuals have strong attachment to place they may continue to adopt contradictory positions. Recognising individuals as partners in, and not solely recipients of, adaptation planning is therefore crucial.

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Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.jenvp.2017.12.006.

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